

Annex B: Data on mobile termination rates

This annex provides Vodafone's analysis of mobile termination rates, and the surcharges demanded by AT&T and MCI for calls to foreign mobile networks. The FCC will note that when account is taken of rates offered by different mobile operators in different time periods, and under different charging structures, the actual situation differs significantly from that reported by the European Commission's Independent Regulators' Group (IRG).

RESULTS

The FCC will note:

- a continuous downward trend in foreign mobile termination rates over the last 5 years;
- significant asymmetries in the termination rates offered by different foreign mobile network operators in the same country; and
- evidence that the surcharges demanded by AT&T and MCI overstate the average mobile termination rate in many countries (particularly when account is taken of the time of day profile faced by US callers).

METHODOLOGY AND SOURCE

The underlying data for the analysis of this Annex has been collected as follows:

- **Since April 2003:** Cullen-International collects all European mobile termination rates. Vodafone has verified the accuracy of this information against its own sources. Non-European rates are based on Vodafone's own information.
- **Pre April 2003:** rates are not uniformly collected from any one source and were often considered commercially confidential. Therefore, Vodafone has used a variety of 3rd party sources, including Cullen-International, and cross-checked the consistency against Vodafone proprietary information for countries where this is available.

The analysis is intended to allow cross-country and time trend comparison. In order to allow meaningful comparisons between countries, and over time, average rates per minute have been calculated for each country using the following generic assumptions (listed in order of significance):

1. A common distribution of traffic throughout the week has been assumed as shown below. This distribution allows the estimation of average termination rates for each operator, taking of account of variations in the weekly charging periods. For example, UK and Ireland have relatively short peak rate charging periods, while other countries have more lengthy peak rate charging period. We note that the IRG use default weights of 50% (weekday daytime), 25% (weekday evening and night) and 25% (weekend). The IRG method fails to capture differences in charging periods between operators. Neither of these weighting patterns will correspond to the actual traffic volumes in any one individual country and so, for example, the mobile termination rate will be over-stated in countries that have a lower proportion of weekday daytime calls. However, if traffic distributions

were to be varied between countries, cross-country comparisons of average termination rates would not be on a true like-for-like basis.

2. For most countries, a negative exponential distribution of call lengths has been assumed. This is only relevant in cases where countries have an indivisible unit charging structure (e.g. Portugal and Spain, and France prior to the January 2004 rate changes). The only exception is the case of France, where the results have been over-ridden with a Weibull distribution to be consistent with the assumptions made by the French regulatory agency to set the price cap.
3. An average call duration of two minutes has been assumed for all countries. We note that the IRG assumes an average call length of 3 minutes, which is likely to be an over-statement for mobile calls.
4. Currency conversions have been made using Purchasing Power Parities (PPPs) published by the Organisation of Economic Co-operation and Development (OECD). These differ from exchange rates for individual countries (e.g. Switzerland), but give a more appropriate and stable comparison of the underlying inter-country cost differences. The key PPPs used are as follows:¹

Table B.1 Purchasing Power Parities / €

	1999	2000	2001	2002	2003
Denmark / €	9.3862	9.5136	9.4671	9.6233	9.5795
Norway / €	10.2790	10.1923	10.3401	10.4338	10.5114
Sweden / €	10.4241	10.3959	10.5896	10.6849	10.7045
Switzerland / €	2.1763	2.1493	2.1542	2.0548	2.0455
UK / €	0.7188	0.7149	0.7075	0.6963	0.7045
Japan / €	180.80	175.34	168.93	164.38	156.82
New Zealand / €	1.5960	1.6403	1.6667	1.6781	1.6705
Australia / €					1.5341
US / €					1.1364

Source: OECD (<http://www.oecd.org/dataoecd/61/54/18598754.pdf>)

5. Where relevant, an assumption is applied that 98% of traffic is handed to the mobile operator in the far-end charge area. Fixed operators without geographic coverage are likely to find it more efficient to buy transit from another fixed carrier rather than pay higher mobile termination rates effectively for transit on the mobile network. Since such charging variations are minimal, this assumption will have little impact on any comparison.
6. Rates have been averaged over mobile operators according to national subscriber shares. In theory, traffic volumes should be used, but this information is not published for all operators in all markets. The IRG appear to adopt a similar approach.
7. Prior to the year 2003, mobile termination rates were commonly not published in many countries. Therefore, while Vodafone is aware of its own rates, rates for other operators are in some instances assumed or based on other sources.

¹ No PPP adjustments have been made between euro-zone countries.

Any errors in judgments made in these assumptions are unlikely to have any material effect on the data shown below.

HISTORIC PRICE MOVEMENTS

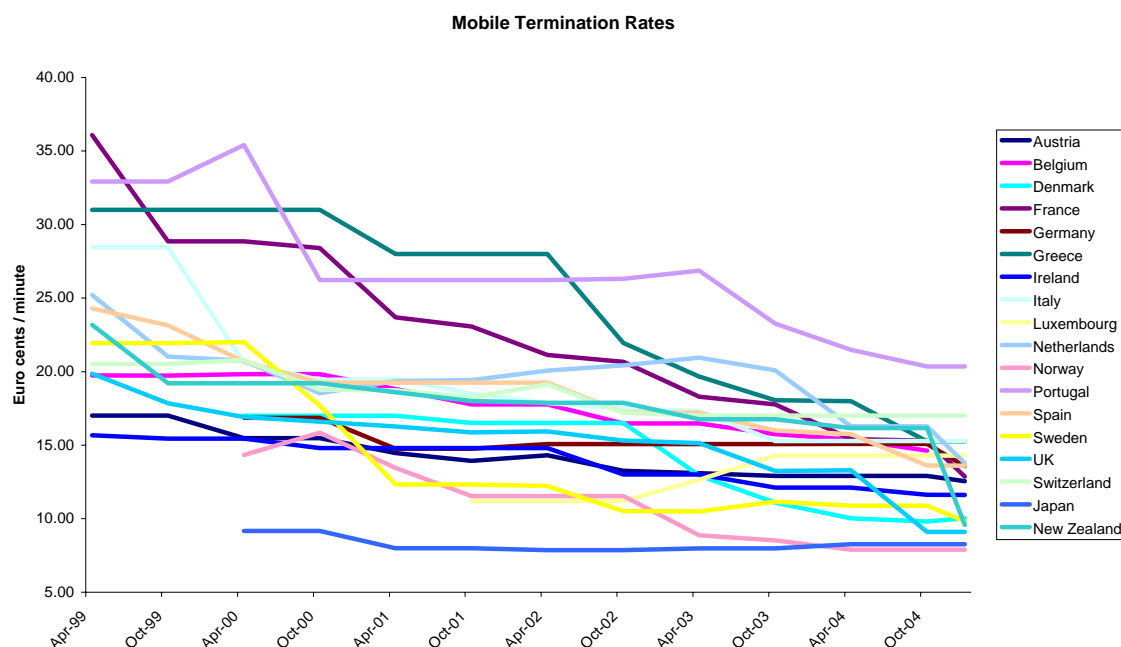
The Table B.2 below shows the magnitude of downward movement in mobile termination rates over time, in markets in which Vodafone has an interest. Table B.2 and the accompanying Graph B.2 clearly illustrate the downward trend brought about by foreign nation regulatory action. Between 1999 and 2002 mobile termination rates in the countries listed fell by an average of 7% each year. Since 2002, the rate of decline has accelerated to an average of 10% each year.

Table B.2: Cumulative percentage reductions in mobile termination rates, 1999 to 2005, Selected countries.²

Country	Annual average reduction (1999-2005)	Cumulative reduction (1999 to 2005)
Austria	5%	24%
Belgium	5%	26%
France	14%	58%
Germany (from 2000)	4%	19%
Greece	11%	51%
Ireland	5%	26%
Italy	10%	46%
Netherlands	10%	45%
Portugal	8%	38%
Spain	9%	44%
Sweden	13%	55%
UK	12%	54%
Switzerland	3%	17%
Japan	2%	10%
New Zealand	14%	59%
Australia (from 2003)	10%	14%

² See Annex B.

Figure B.1 reductions in Mobile Termination Rates, 1999-2004, Selected Countries



Source: Vodafone analysis based on public and proprietary sources

A number of countries are now establishing or proposing price cap 'glide paths' down to significantly lower levels in future years. These countries include Sweden, France, Australia and Portugal (see Table B.3).

Table B. 3 Examples of Agreed and Proposed Glidepath Reductions in Foreign Mobile Termination Rates

Country	Term of Glidepath	Average annual reduction	Cumulative Reduction
<i>Australia</i>	To Jan 2007	18 %	33 %
<i>France</i>	To Jan 2006	24 %	24 %
<i>Germany</i>	To Dec 2005	17 %	17 %
<i>Portugal</i>	To Oct 2006	30 %	46 %
<i>Sweden</i>	To July 2007	24 %	50 %

Note: Percentage reductions refer to the average for all operators.

Source: Vodafone analysis based on public sources

Table B.4 shows the absolute level of average mobile termination rates in the same selection of countries. These rates have been averaged across operators and time of day using the methodology described above. It is important, however, to realize that a standard time of day profile will *not* reflect US outbound traffic. In order to illustrate the difference, the last column of Table B.4 recalculates the average mobile termination rate in each country under the assumption that the time of day profile is shifted forward by four hours.³

Table B.4: Current Mobile Termination Rates (using PPPs)

	US cents / minute ('24x7' average)		
	Standard '24x7' profile		Illustrative US '24x7' profile*
	Largest mobile operator	All mobile operators	All mobile operators
Austria	12.3	14.3	14.5
Belgium	14.4	16.6	15.8
France	14.2	14.6	14.1
Germany	15.0	15.4	15.4
Greece	17.0	17.3	17.3
Ireland	13.0	13.2	12.4
Italy	17.0	17.4	16.6
Luxembourg	16.2	16.2	15.6
Netherlands	15.0	15.7	15.7
Portugal	21.0	23.1	22.9
Spain	14.6	15.5	14.5
Denmark	11.4	11.4	9.9
Norway	7.9	9.0	8.9
Sweden	8.5	11.2	10.8
Switzerland	18.6	19.3	18.9
UK	9.1	10.3	8.6
Japan	9.0	9.4	9.4
New Zealand		10.9	11.2
Australia		13.3	13.5

Source: Vodafone analysis based on public and proprietary sources

*Time of day profile shifted by 4 hours.

SURCHARGES IMPOSED BY AT&T AND MCI

In interpreting the data of Table B.5 it should be borne in mind that AT&T and MCI surcharges are in respect of the **difference** between the mobile and fixed termination rate (and not the absolute mobile termination rate). Fixed domestic termination rates are of the order of 1-2

³ The time difference between Central European Time (CET) and US time zones is between 6 and 9 hours. We can assume that US and European callers will both compromise and 'split the difference' in the time they call. On this basis we selected a 4 hour time shift as a reasonable compromise. This has the effect of moving the peak load traffic to late evening (CET) or late morning to early afternoon (US time zones). This procedure appears to give a time of day profile consistent with Vodafone's own traffic records. However, exact reconciliation is not possible since the origin of mobile termination is not always known by the mobile network operator. Adjustment is not required for non-European countries since rates are invariant to time of day.

cents, and this amount is subtracted from the mobile termination rates to give a fair comparison with the AT&T and MCI surcharges. It can be seen, therefore, that the surcharges of AT&T and MCI are an average for 4-5 cents above the levels we would expect, based on a US traffic profile.

Table B.5: Current Mobile Termination and AT&T and MCI Surcharges (expressed as US cents with exchange rates)

	Mobile Termination Rate Premium (i.e. Mobile Termination Rate less estimated fixed termination rate)	User Surcharges			
		AT&T		MCI	
		% 'mark-up'		% 'mark-up'	
Austria	15.2	17	12%	21	38%
Belgium	16.8	25	49%	19	13%
France	15.5	22	42%	20	29%
Germany	16.3	19	17%	20	23%
Greece	18.6	23	24%	25	34%
Ireland	12.9	17	32%	13	1%
Italy	17.7	23	30%	19	7%
Luxembourg	16.6	13	-22%	19	14%
Netherlands	16.6	27	63%	24	45%
Portugal	25.0	24	-4%	21	-16%
Spain	15.3	19	24%	19	24%
Denmark	13.4	18	34%	16	19%
Norway	11.8	16	36%	17	44%
Sweden	13.4	24	79%	19	42%
Switzerland	28.1	30	7%	27	-4%
UK	8.6	22	156%	16	86%
Japan	11.0	13	18%	14	27%
New Zealand	9.7	24	147%	22	127%
Australia	12.2	19	56%	19	56%
Average	15.5	20.8	34%	19.5	26%

Source: Vodafone analysis based on public and proprietary sources

CONCLUSIONS ON SURCHARGES

Three conclusions can be drawn from Table B.5:

- There is only a weak correlation between the surcharges of the US carriers and foreign mobile termination rates or, for that matter, between the surcharges of AT&T and MCI themselves. Although the average level of surcharges is similar between AT&T and MCI, charges for individual countries differ significantly (e.g. in the case of Belgium and Sweden AT&T's surcharge is about 30% higher than that of MCI). These differences do not reflect differences in international routing, since the surcharges are in respect of mobile termination only. This suggests (a) AT&T and MCI are not particularly concerned about the threat of arbitrage between the rates they offer; and (b) either AT&T, MCI or both, lack diligence in ensuring that surcharges are aligned with the additional costs of mobile termination.
- AT&T (and possibly MCI) appear frequently to fail to net off the fixed termination saving in calculating the surcharges (e.g. in the case of Austria, Germany). This effectively inflates surcharges by 1-2 cents per minute.
- In general, AT&T and MCI appear to levy surcharges at a level sufficiently high to cover the peak period mobile termination charge in each foreign country. Furthermore, in some cases where there are significant asymmetries in rates between operators within countries, the surcharges are inflated to cover the most expensive operator (e.g. Bouygues in France whose termination rates are 4 US cents above those of Orange and SFR, Q-telecom in Greece whose mobile termination rates are 7 US cents above those of Cosmote and Vodafone, NetCom in Norway whose termination rates are 5 US cents above those of Telenor Mobile, '3' in the UK whose termination rates are 11 US cents above those of O² and Vodafone).

Vodafone believes that this over-recovery could be eliminated if AT&T and MCI aligned their charging period more closely to those of foreign mobile operators. Foreign mobile operators often set time of day charges to aid efficient usage of their networks. US consumers are well placed to benefit from these discounted prices due to the time differences between the US and many foreign countries. Moving the AT&T and MCI charges in line with price signals would allow US consumers to benefit from cheaper off-peak prices available on foreign networks. In contrast, the current structure of AT&T and MCI charges do not allow US consumers to benefit from cheaper calls to foreign mobiles at off-peak times, with the benefits effectively flowing to AT&T and MCI.

AT&T and MCI also seem to increase their overall surcharges to cover the cost of the most expensive operator in each country, no doubt also to eliminate the risk of arbitrage. Eliminating rate asymmetry in foreign mobile markets would address this.